APPENDICIES

FIGURES

AP1. APPENDIX 1

HEAT TRANSMISSION FACTOR CALCULATIONS

Table AP1.T1. "U" Factors for Temperature Ranges

WAREHOUSE (EXCLUDING ADMINISTRATIVE AREA)	BELOW (-) 10° F	ABOVE (-) 10° F TO 10° F	ABOVE (+) 10° F
Walls	0.17	0.27	0.50
Roof	0.12	0.18	0.25

Table AP1.T2. Maximum Heat Transmission Values 1/

DEGREE DAYS	GROSS WALL 2/ Uo 3/	WALLS Uw 4/	CEILING/ROOF Ur 5/	FLOOR Uf 6/	Uf 7/
100-1,000	0.31	0.15	0.05	0.10	0.29
1,001-2,000	0.23	0.15	0.05	0.08	0.24
2,001-3,000	0.18	0.10	0.04	0.07	0.21
3,001-4,000	0.16	0.10	0.03	0.07	0.18
4,001-6,000	0.13	0.08	0.03	0.05	0.14
6,001-8,000	0.12	0.07	0.03	0.05	0.12
Over 8,001	0.10	0.07	0.03	0.05	0.10

Notes:

1/ Heat transmission values are expressed in English units. (U=BTU/H.SF.°F) (For climatic zones not requiring heat and if air conditioning of certain functional areas are authorized in AR 420-54, the Thickness and type of insulation will be determined by using a heat transmission coefficient (U) of 0.15 for exterior walls and 0.12 for roofs/ceilings).

2/ Gross wall values include all doors and windows, window frames, metal ties through walls structural steel members that protrude through all insulation to the exterior and continuous concrete or masonry wall or floors; i.e., fire walls that extend above the roof and concrete floor slabs that extend beyond the exterior wall to form a balcony or terrace.

3/ Gross "Uo" values are to be used for all new construction and major alteration of facilities.

4/ Wall "Uw" value is the thermal transmittance of all elements of the opaque wall area. "Uw" values are to be used for upgrade of existing facilities where the alteration of walls and resizing of window glazing, to meet gross wall values which is not cost effective.

5/ Ceiling/roof "Ur" values are for ceiling/roof areas where adequate space exists for insulation to be applied above the ceiling and/or below roof structure. Built up roof assemblies and ceiling assemblies in which the finished interior surface is essentially the underside of the roof deck shall have a maximum "Ur" value of 0.05 (0.284) for any Degree Day area.

6/ Floor "Uf" values are for floors of heated space over unheated areas such as garages, crawl spaces and basements without a positive heat supply to maintain a minimum of fifty degrees Fahrenheit (50° F) (ten degrees Centigrade (10° C)).

7/ Floor "Uf" values are for slab-on-grade insulation around the perimeter of the floor.

AP2. APPENDIX 2

INTERIOR FINISHES

		INTERIOR ROOM FINISHES				
	FUNCTIONAL AREA	FLOOR	BASE	WAINSCOT 4/	WALLS	CEILING
1.	Assembly Hall	CONC/H	GSU	Epoxy	EXP-P	EXP-P
2.	Rifle Range	CONC/H	GSU	None	EXP-P 1/	EXP-P 1/
3.	Classroom/Learning Center/Library/Insp & Library	VCT/CPT	RB or GSU	None	EXP-P Chair-rail 16/	ACST/GWB-P
4.	Training Aid Storage/ Audio/Visual style	CONC/H	GSU or RB	None	EXP-P	EXP-P
5.	Unit Storage Including Arms Vault	CONC/H	GSU or RB 8/	None	EXP-P	EXP-P 2/
6.	Admin Office Areas	VCT or CPT 14/	RB or GSU	None	EXP-P Chair-rail 16/	ACST/GWB-P
7.	Locker Rooms	CONC/H	GSU or RB/Epoxy	GSU/ Epoxy	EXP-P	EXP-P
8.	Toilet 5/	CT/QT	GSU/CT/ Epoxy	GSU/CT Epoxy	EXP-P	PLAS-P 6/
9.	Shower 5/	CT/QT	GSU/CT	None	GSU/CT/	PLAS-P 6/ Epoxy
10.	Scullery, Food Storage & Preparation Area 5/	VCT/CT/ QT	GSU/CT/ Epoxy	None	GSU/CT Epoxy	PLAS-P 6/
11.	Facility Maintenance & Storage	CONC/H	None	None	EXP-P	EXP-P 2/
12.	Mech/Elec/Telecom Equipment Room	CONC/H	None 3/	None	EXP-P	EXP-P 2/
13.	Lobby & Corridors Radiating from the Lobby	VCT/CPT	GSU/CT Epoxy	GSU/CT/ Epoxy FB 7/	EXP-P	PLAS-P/ ACST
14.	Other Corridors	VCT	GSU/ Epoxy	GSU/ Epoxy	EXP-P	ACST

INTERIOR FINISHES

		INTERIOR ROOM FINISHES				
	FUNCTIONAL AREA	FLOOR	BASE	WAINSCOT 4/	WALLS	CEILING
15.	OFC (General Officer)	VCT/CPT	RB/GSU	None	PL/PLP Chair-rail 16/	ACST/GWB-P
16.	FMB	CONC/H	None	None	EXP-P	EXP-P 2/
17.	Band Rehearsal Studio (Including Classroom used for that purpose)	CPT	GSU/RB	None	ACST	ACST
18.	Instrument Storage	CONC/H	GSU/RB	None	EXP-P	EXP-P
19.	Music Library	VCT	GSU/RB	None	EXP-P	ACST/GWB-P
20.	Med Exam Suite	VCT	GSU/RB	None	EXP-P	ACST/GWB-P
21.	CMDSA (COMSEC Material Direct Support Activity) 12/	CONC/H	GSU/RB	None	EXP-P	ACST
22.	Maint Training Workbays (MTB)	CONC/H 13/	None	None	EXP-P	EXP-P
23.	MTB Battery Room	CONC/H 14/	None 13/	None	Epoxy	EXP-P
24.	MTB Supply Room	CONC/H	None 13/	None	EXP-P	EXP-P
25.	MTB Tool Room	CONC/H	None 13/	None	EXP-P	EXP-P
26.	MTB Foreman's Office	VCT	RB/GSU	None	EXP-P	ACST/GWB-P
27.	MTB Insp/Lib	VCT	RB/GSU	None	EXP-P	ACST/GWB-P
28.	Table & Chair Stg	CONC/H	None 3/	None	EXP-P	EXP-P 2/
29.	Phys. Fit. Area	CPT	RB/GSU	Note 11/	EXP-P 9/	ACST 10/

NOTES FOR INTERIOR FINISHES

1/. Acoustical material limited to that area from the plenum wall to a point 30 FT downrange from the firing line.

2/. Unless ceiling is required for fire protection or security.

3/. For other than masonry wall construction RB or GSU is authorized.

4/. 5 FT high.

5/. Seamless epoxy floor, base, and walls may be substituted for CT, QT, or GSU.

6/. GWB/Epoxy or Skimcoat of plaster may be substituted for PLAS-P. In areas where extensive mechanical, electrical or piping is located in the ceiling space, suspended panels may be authorized if not restricted by local codes.

7/. Face brick is supportable in lobby only.

8/. Base should be omitted in vault to preclude interference with installation of arms rack.

9/. Mirror walls, 1 FT above floor to 6 FT 6 IN high by 3 FT 4 IN wide installed in front of each machine which faces the wall. A 4 FT double door and a second exit as a standard double door should be provided.

10/. Dropped ceiling height should be approximately 9 FT or more if obtainable when complying with the 10 FT structure height requirement.

11/. A kickboard to 1 FT above floor (may be rug extended up) may be provided.

12/. The CMDSA room is to have one-hour fire rated walls from floor to true ceiling. The one-hour fire rating is to ensure security, not to meet fire codes. The walls/doors may have openings, but any opening greater than 96 IN) is to be equipped with steel bars to prevent entry. The door is to have a "Class 1R" Combination Lock for use during non-duty hours and may have a mechanical cipher lock for use during duty hours.

13/. RB/GSU is authorized when required on other than masonry construction if required to prevent water damage.

14/. Concrete with a chemical/acid resistant urethane finish is authorized instead of a clear liquid hardener/sealer.

15/. Exposed CMU walls and roof deck should be painted. Light colors and non-glossy finish should be used to compliment the light system without causing reflections.

16/. Chair-rail 3 IN wide custom grade wood/non-stain grade.

KEYS TO ABBREVIATIONS

ACST	Acoustical suspended tile, 2 FT by 4 FT or 2 FT by 2 FT tiles.
CPT	Carpet. A 26-28 oz. (face weight), permanent static-free (2.5KV or less), cut or loop pile nylon or acrylic commercial grade (direct glue down without cushion) carpet is recommended.
CT	Ceramic Tile (Thick or thin in set) and ceramic or marble threshold.
EXP	Exposed construction (1 coat of paint is authorized for corrosion protection of exposed ungalvanized metal only; touch up of factory prime coat is authorized on ungalvanized metal not exposed to public view).
EXP-P	Exposed Construction, painted.*
GSU	Glazed Structural Units (without cove on base units defined as prefaced concrete masonry unit, Federal Specification 8SS-C-621b, (Form B).
GWB-P	Gypsum Wallboard, painted.*
PLAS-P	Plaster, painted.*
*	Painted means enamel, latex or equivalent cost paint.
RB	Resilient Base.
VCT	Vinyl Composition Tile (thickness 3/16 IN or less) on monolithic concrete finish.
QT	Quarry Tile.
PL or PLP	Plaster or Plywood Paneling.
CONC/H	Clear Liquid Hardener/sealer over exposed concrete.
Epoxy	Epoxy Base Paint (coating should not exceed two application system).
FB	Face Brick.

AP3. APPENDIX 3

INDOOR RANGE REQUIREMENTS

AP3.1. RANGE CRITERIA

AP3.1.1. Purpose. The purpose of this criteria is to assist the design agency in preparing a detailed design for an indoor firing range facility. This criteria is also provided for the planning and retrofitting of existing indoor firing ranges.

AP3.1.2. Applicability. The design information presented in this document is not intended to be used as a completed design ready for construction, nor to relieve the designer from any liability of providing a properly designed indoor firing range that meets all safety and health standards. Instead, this criteria should be used to help the design agency develop a construction design that will provide a safe, operable indoor firing range.

AP3.1.3. References. References cited in this Appendix are listed in Appendix 8 (References) of DG 415-5 (General Appendices). Construction must comply with current Federal and State occupational safety and health standards and follow the deign criteria established by the United States Army Corps of Engineers June 1990: "Design Guide for Indoor Firing Ranges" which includes all applicable figures, tables, and other details.

AP3.1.4. Indoor Firing Range

AP3.1.4.1. General. The indoor range facility provides a standard indoor firing range where marksmanship tasks can be practiced. The standard indoor range design consists of five 82-FT (25-Meter) long firing lanes. A ventilation system provides a safe, environmentally clean area during weapons firing. Since the indoor firing range is not meant to be a stand-alone facility, it should be constructed adjacent to other functional areas.

AP3.1.4.2. Training Objectives. The types of training exercises to be accommodated by this range are primarily weapons familiarization and practice for weapons qualification.

AP3.1.4.3. Weapons And Ammunition. The range design is to be suitable for firing the M-16 rifle utilizing 5.56 caliber, all handgun ammunition, all shotgun shell ammunition including slugs, and for occasional use with soft point rifle ammunition with the muzzle velocity and energies under 2,000 FT per second and 2,200 foot-pounds, respectively. The sizes and types of non armor-piercing ammunition for the range are 9-mm ball; .38-caliber ball; .45-caliber ball; .22-caliber ball; and 12-gauge shotgun shells (all types).

AP3.1.4.4. Range Requirements Checklist. _Indoor Small Arms Firing Ranges are authorized when supported by an Army National Guard Indoor Range Requirements Checklist (as shown not the following pages) and validated and approved by NGB-ART. In addition, a life cycle cost analysis must be provided NGB-ARI to insure the State's awareness of the maintenance and operations costs incurred by the operation of the range.

ARNG INDOOR RANGE REQUIREMENTS CHECKLIST

PROJECT TITLE:_____ LOCATION:_____

This checklist will be utilized to justify the requirement for construction or upgrade of an indoor range. This checklist incorporates requirements contained in the AR (Army Regulation)210-21 (Army Range and Training Land Program) and the NGR 415-10.

1. Training Readiness Shortfall Mitigation

   a. List the ARNG units that will utilize this range and the location at which they perform weapons qualification now:

Unit	Auth Strength	Current Range Utilized	Comments

   b. Provide Unit Status Report Commander's Narrative comments that indicate this range is necessary to fulfill a training readiness shortfall.

   c. Indicate the approximate number of soldiers that will utilize this range annually for:

      Weapons qualification - _____
      Weapons familiarization - _____

2. Indicate the adequate ranges (Indoor and Outdoor) that exist within a two-hour convoy (approximately 90 miles) from this proposed range facility. Adequate means that the facility:

   a. Is under military control or available under written agreement for scheduled use,

b. Has the capacity to accommodate authorized strengths of using units,

c. Complies with appropriate range construction criteria,

d. Complies with current OSHA and NGB Safety requirements.

Range Facility	Indoor or Outdoor	Dist from Proposed Range	Ownership DOD/Non-DOD

3. List any entities other than ARNG that will utilize this facility.

4. Indicate any environmental enhancements that will be incorporated into this facility.

5. Indicate the projected OPTEMPO cost avoidance per year based on transportation and other costs of utilizing existing ranges.

6. Indicate the current cost estimate for this range project.

I have ensured that all of the information above is correct. I have attached supporting documentation as applicable.

_____

Name Rank Position Phone Number

AP4. APPENDIX 4

DINING FACILITY REQUIREMENTS

AP4.1. GENERAL NOTES

There are standard drawings and kitchen equipment schedules that may be obtained from the State Construction and Facilities Management Officer or the Army Center of Excellence, Subsistence, U.S. Army Quartermaster Center and School, Attn: ATSM-CES-OE, 1201 22nd Street, Bldg. P-5000, Fort Lee, VA 23801-1601, Commercial (804)734-3450; DSN: 687-3354. Dimensions and equipment authorizations vary depending on the number of personnel to be supported by the facility. Figure AP4.F1 shows a US Troop Support agency approved configurations for an Army National Guard armory dining facility for small armories sized to 350 personnel. Figure AP4.F2 shows a US Army Troop Support agency approved configurations for large armories sized for greater than 351 personnel. Dimensions are approximate and should be tailored by the designer to suit construction constraints and techniques. Equipment authorizations may be determined from the floor plan; authorized equipment items may be obtained from the State Construction and Facilities Management Officer.

AP4.1.1. All authorized equipment is divided into the following Log Classifications:

AP4.1.1.1. Equipment authorized to be installed (i.e. attached to the floor and/or permanently connected to the building structure or utility system) as part of the construction contract.

AP4.1.1.2. Equipment which will be furnished through supply channels and owner installed and for which the contractor is to provide utility connections to the point

of use (equipment itself should not be included in the construction contract).

AP4.1.1.3. Portable equipment which will be provided through supply channels and owner installed (and which should not be included in the construction contract) and for which no utility hook-ups are required (but which should be considered in the space layout and operational plan).

AP4.1.1.4. The wall opening at the serving line should be 11 FT wide to accommodate the cold food counter and hot food table. The FMO in coordination with Troop Support Agency (TSA) will provide the A&E with a catalog of TSA approved equipment and specification sheets which will establish electrical and mechanical requirements.

Figure AP4.F1 Small Dinning Facility

(A REVISED FIGURE WILL BE PUBLISHED AT A LATER DATE)

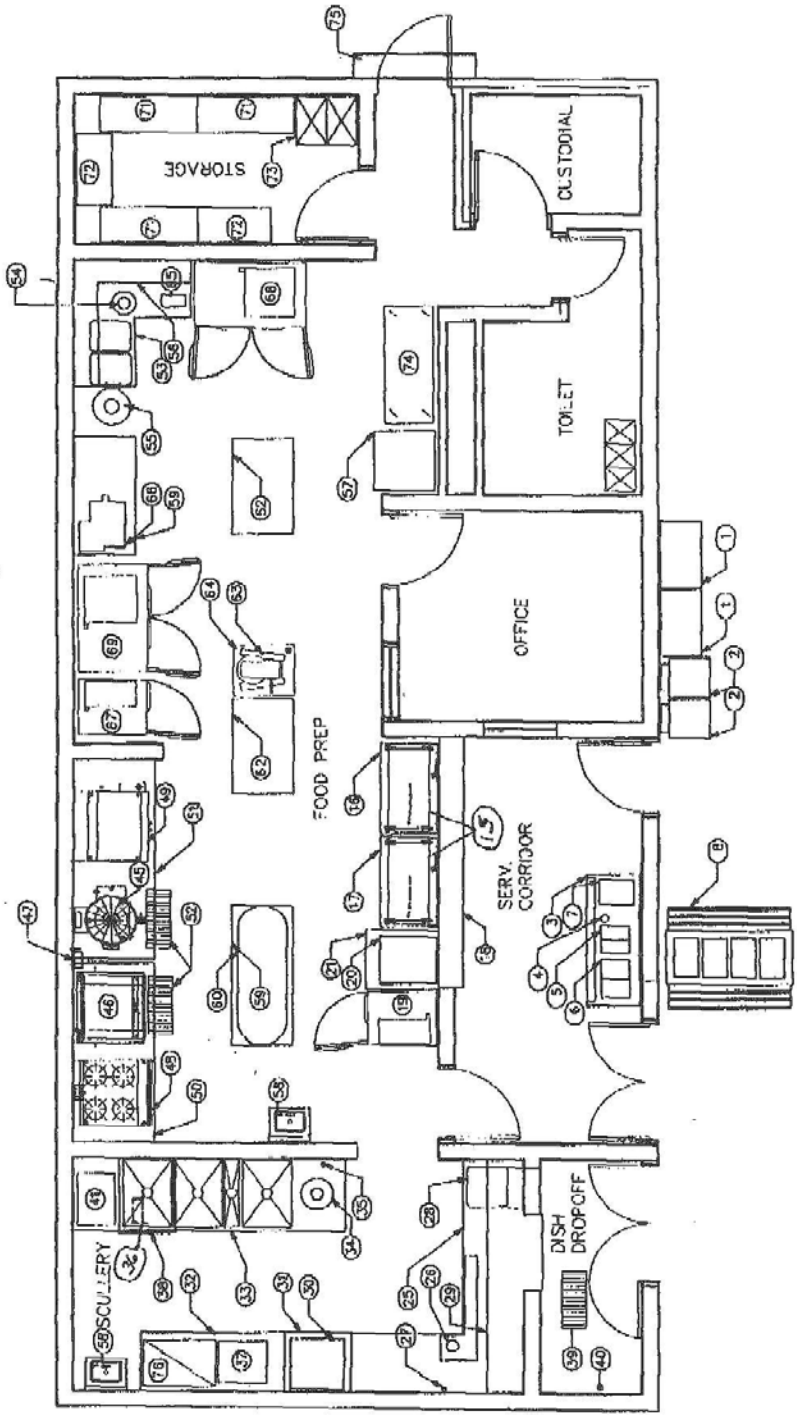
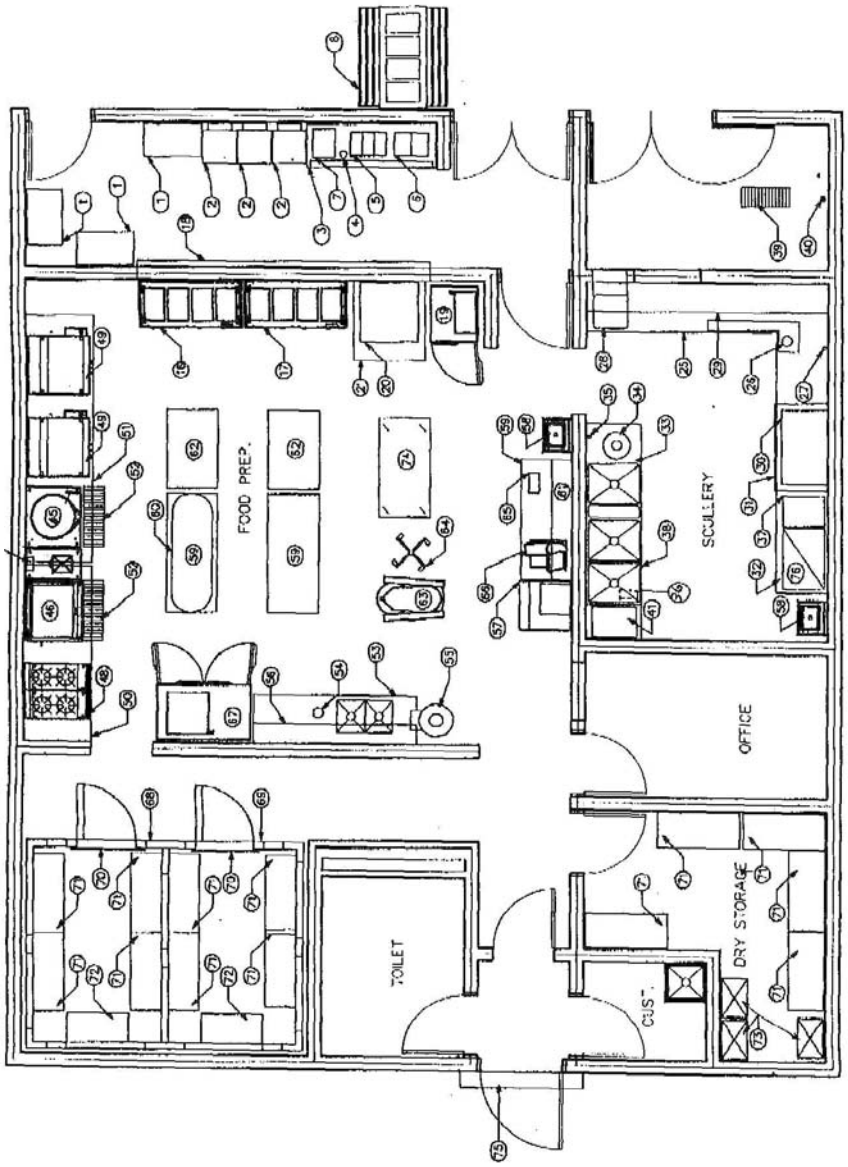


Figure AP4.F2 Large Dinning Facility

(REVISED FIGURE WILL BE PUBLISHED AT A LATER DATE)



AP5. APPENDIX 5

TYPICAL READINESS CENTER LAYOUTS

Figure AP5.F1 Optimum Physical Relationships

(A REVISED FIGURE WILL BE PUBLISHED AT A LATER DATE)

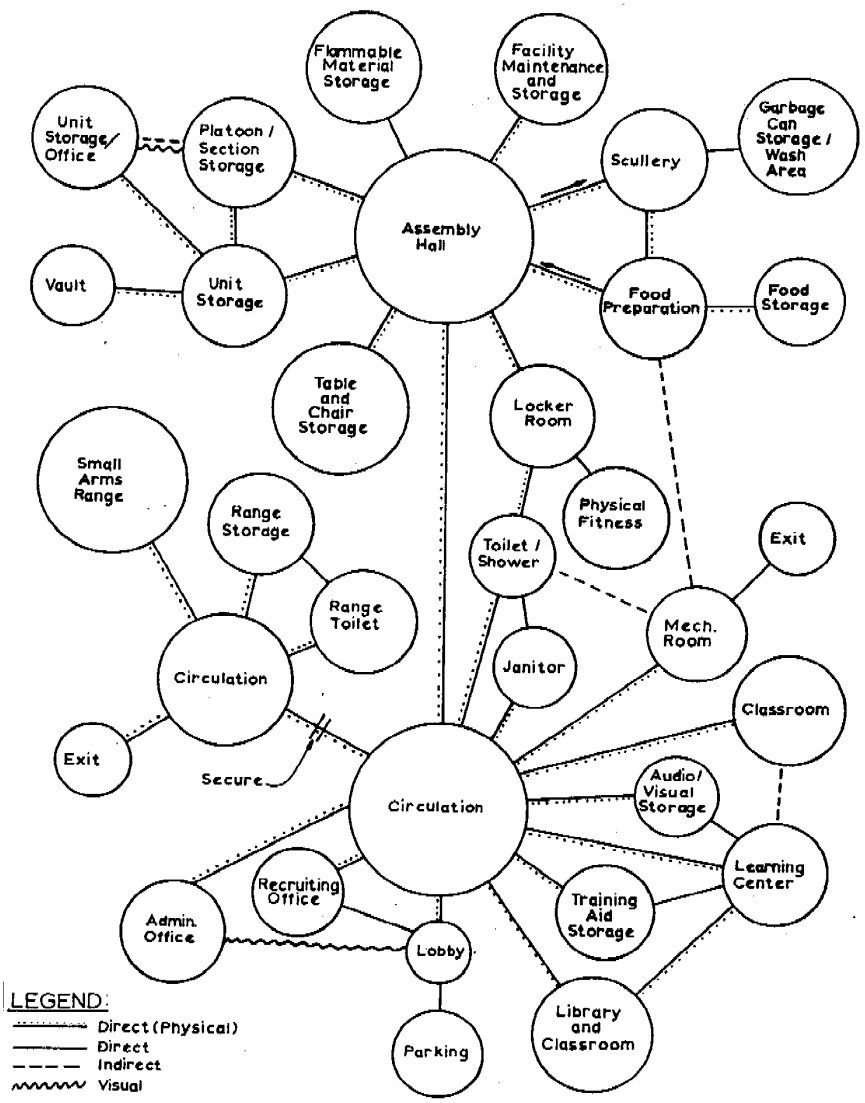
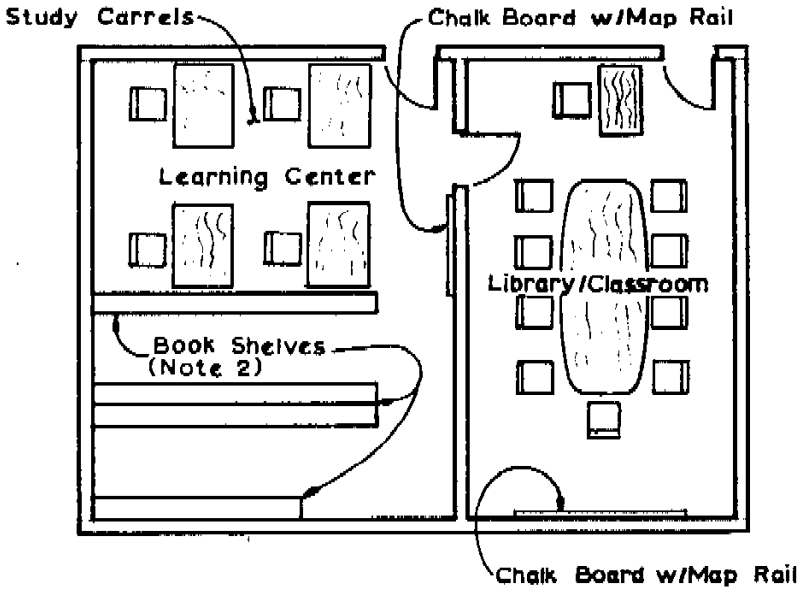


Figure AP5.F2 Typical Learning Center and Library

(A REVISED FIGURE WILL BE PUBLISHED AT A LATER DATE)



NOTES:

1. STUDY CARRELS, TABLE/CHAIRS AND PROJECTION SCREEN TO BE PURCHASED WITH OTHER THAN FEDERAL CONSTRUCTION FUNDS. ALL OTHER EQUIPMENT SHOWN SHOULD BE INCLUDED IN THE CONSTRUCTION PROJECT FUNDED FROM CONSTRUCTION FUNDS.
2. THE SHELVING AUTHORIZED FOR THE LIBRARY CLASSROOM WAS LOCATED WITHIN THE LEARNING CENTER.

Figure AP5.F3 Typical Vault Layout

(A REVISED FIGURE WILL BE PUBLISHED AT A LATER DATE)

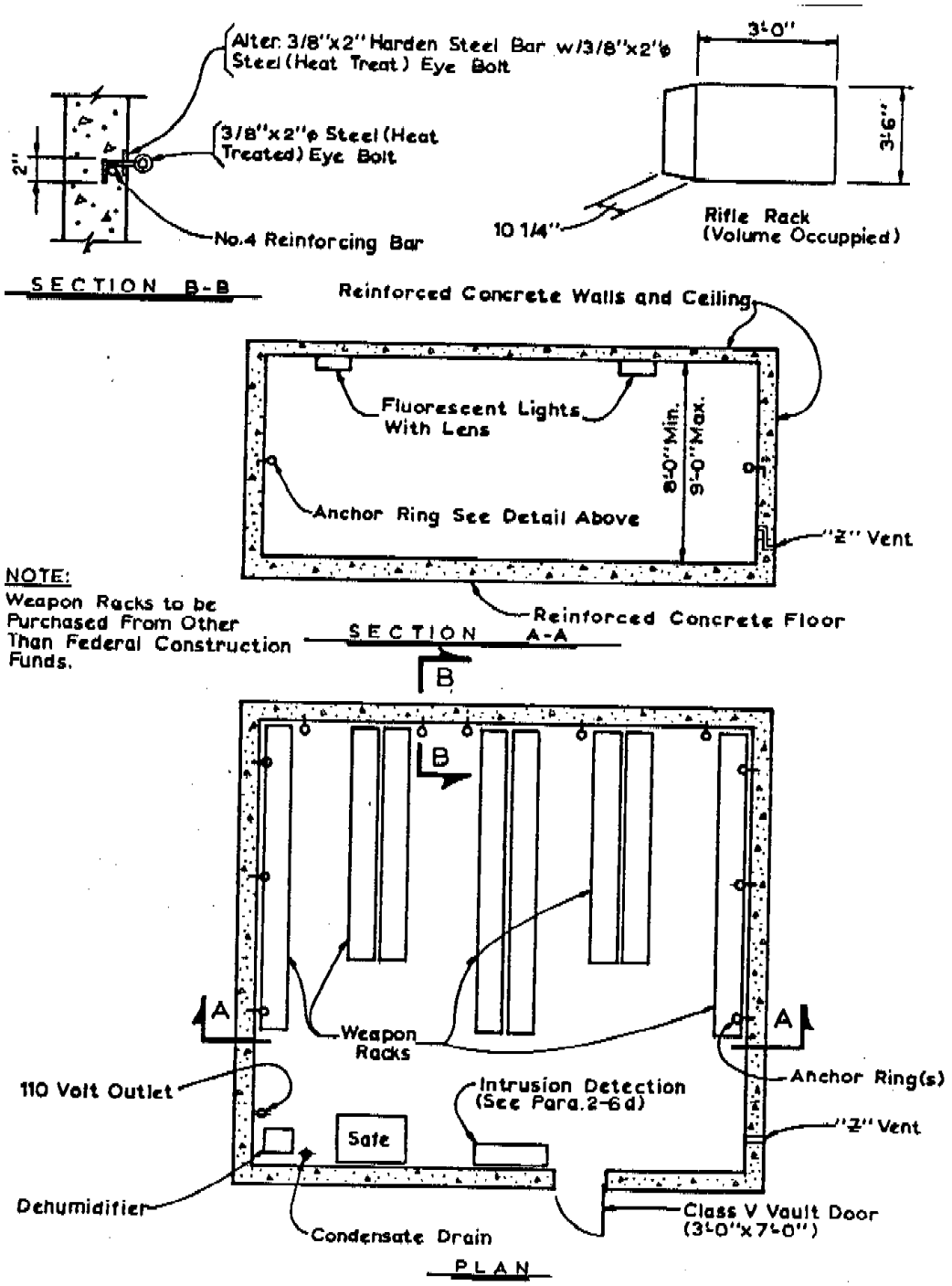


Figure AP5.F4 Typical Readiness Center

(A REVISED FIGURE WILL BE PUBLISHED AT A LATER DATE)

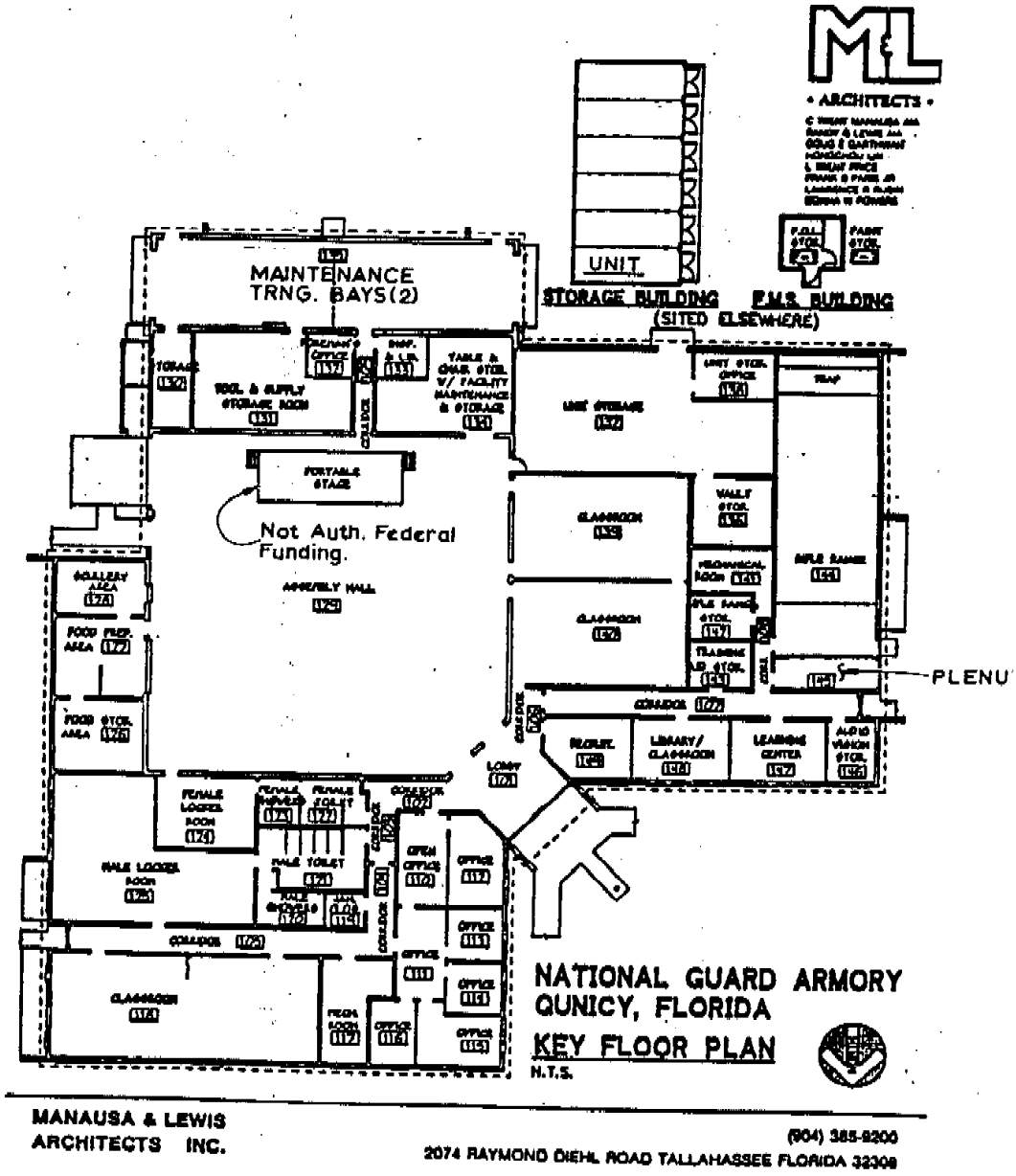
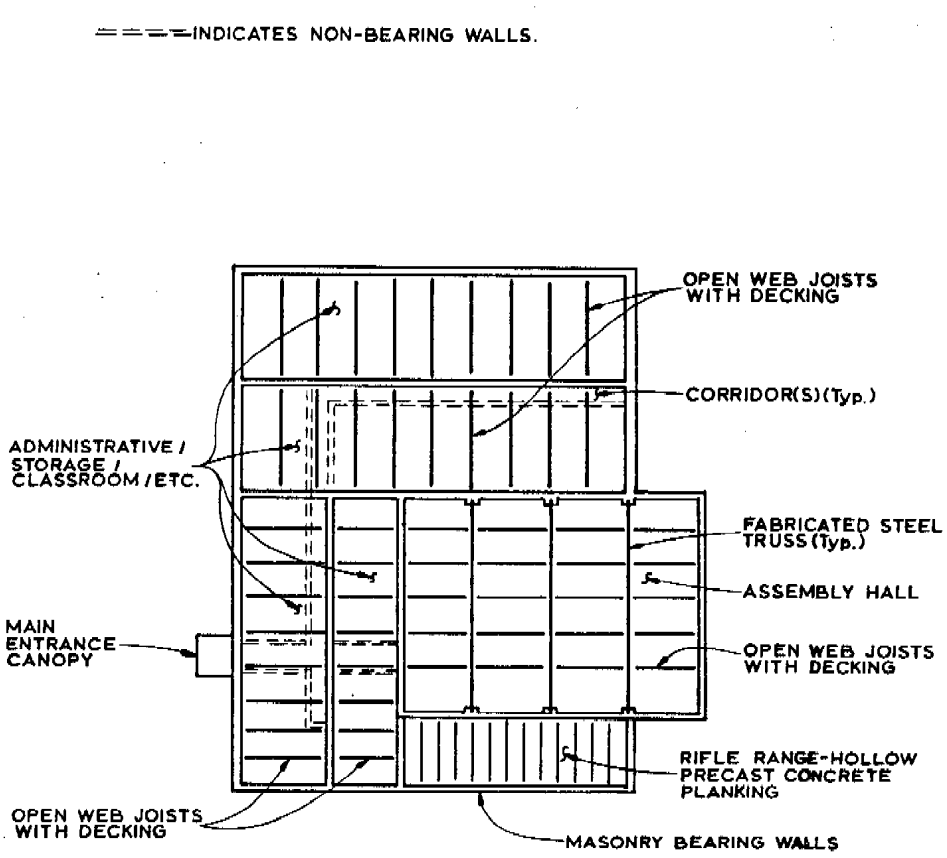


Figure AP5.F5 Typical Framing Plan

(A REVISED FIGURE WILL BE PUBLISHED AT A LATER DATE)



Typical Framing Plan